About Fermi National Accelerator Laboratory

Fermilab is America's premier national laboratory for particle physics research.

The challenge of particle physics is to discover what the universe is made of and how it works. By building some of the most complex and largest machines in the world, Fermilab scientists expand humankind's understanding of matter, energy, space and time, capturing imaginations and inspiring future generations.

Fermilab science

Fermilab produces the world's most intense beam of neutrinos, particles that may hold the key to understanding why the universe is made of matter.

Using the cosmos as a laboratory, Fermilab scientists explore dark matter and dark energy, unexplained phenomena that constitute 96 percent of the universe.

Facilities at Fermilab provide 2,300 researchers from across the country and around the globe with world-class scientific opportunities, keeping the United States at the leading edge of the international field of particle physics.

Fermilab innovation

Bold and innovative ideas and technologies from particle physics have entered the mainstream of society to transform the way we live. From enabling the development of MRI machines to building the first proton accelerator for cancer treatment, Fermilab helps overcome the greatest challenges of our time.

Fermilab is an R&D center for superconducting radio-frequency cavities, the technology of choice for the next generation of accelerators. SRF technology has potential applications in medicine, nuclear energy and materials science.

Fermilab trains tomorrow's scientific workforce

Students trained in particle physics find their way to diverse sectors of the national economy in jobs that require highly developed analytical and technical skills, critical thinking and the ability to solve unique problems.

Fermilab inspires the next generation of scientists through its student and teacher programs. About 20,000 K-12 students participate in science education programs and tours at Fermilab every year, and more than 2,000 teachers receive training from experts in the field.

Photo: Fermilab's Wilson Hall

Fermilab projects now under construction will transform science and society.

Neutrino experiments

Fermilab is building the NOvA experiment, which will study the mysterious transformation of one type of neutrino into another starting in 2013. One of NOvA's detectors will be located in a new underground cavern at Fermilab. The second, near Ash River, Minnesota, may be the largest structure ever built out of plastic, with 368,640 PVC tubes filled with more than three million gallons of mineral oil.

The Liquid Argon Test Facility, being built over the course of 2012 on Fermilab's site, will host the MicroBooNE experiment that will test next-generation detector technologies and measure the properties of neutrinos.

Muon Campus

Fermilab is re-purposing part of the Tevatron accelerator complex to create brand-new beams of particles called muons. Two new experiments will study these heavy cousins of the electrons to understand nature at its most fundamental.

Illinois Accelerator Research Center

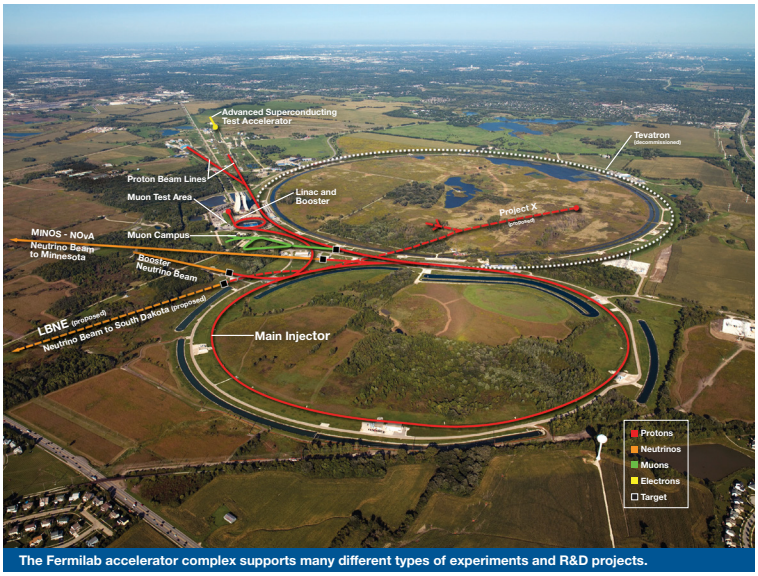
Construction begins in 2012 for a new center that will accelerate innovation in Illinois. More than 30,000 particle accelerators are in operation today across the world, most in the medicine and manufacturing sectors. The Illinois Accelerator Research Center will bring scientists from Fermilab, universities and industry together to advance R&D for particle accelerators and transition the resulting technologies to the marketplace.

Large Hadron Collider research and components

The LHC in Geneva, Switzerland is the world's highest-energy particle collider. Fermilab is a leader in this international project, hosting hundreds of U.S. scientists working on the CMS experiment at the LHC, running a Remote Operations Center and designing and building components at Fermilab for the collider's next phase.

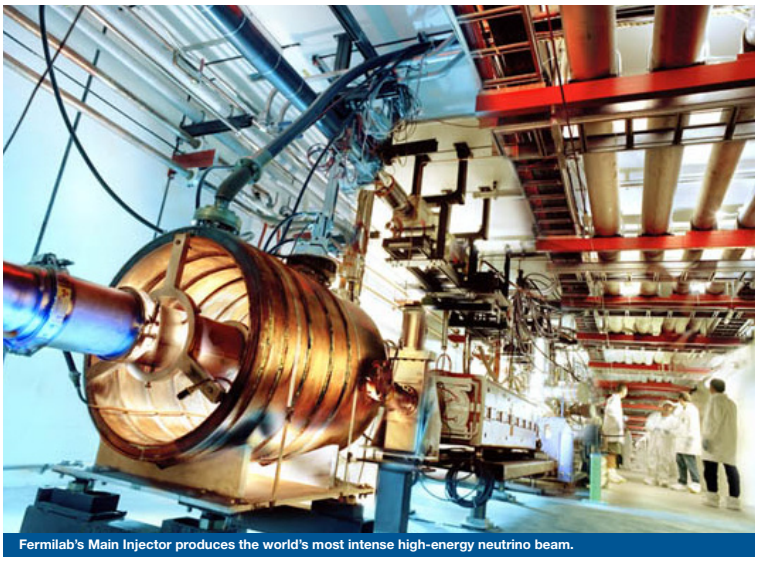
Dark-matter and dark-energy experiments

Scientists only understand about 96% of our universe; the rest is dark matter and dark energy. The Dark Energy Camera designed and built at Fermilab is being installed on a telescope in Chile in 2012. The heart of the Dark Energy Survey, it will collect its first sky images in 2013 and advance the quest to understand the nature of the dark energy that pushes the universe apart. Fermilab also leads four different types of experiments that seek to be the first in the world to capture particles of dark matter.



The Fermilab accelerator complex supports many different types of experiments and R&D projects.

The new Illinois Accelerator Research Center: Space for research, education and industrialization.


Fermilab's Main Injector produces the world's most intense high-energy neutrino beam.